

**REMARKS**

These remarks are filed in response to the rejection mailed May 31, 2007. For the following reasons, this application should be allowed and the application passed to issue.

Claims 1-4, 6-10, 12, and 14-29 are pending in this application. Claims 8, 10, 17-22, 24, and 25 were withdrawn pursuant to a restriction requirement. Claims 1-4, 6, 7, 9, 12, 14-16, 23, and 26-29 have been rejected. Claims 5, 11, and 13 were previously canceled.

***Claim Rejections Under 35 U.S.C. § 103***

Claims 1-4, 6, 9, 14-16, 23 and 26-28 were rejected under 35 U.S.C. § 103 (a) as being unpatentable over Nakamura et al. (U.S. Pat. Pub. No. 2003/0010993).<sup>1</sup> This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. The following is comparison between the invention as claimed and the cited prior art.

An aspect of the invention, per claim 1, is a nitride-based semiconductor light-emitting device comprising a first conductivity type first nitride-based semiconductor layer formed on a substrate. An active layer is formed on the first nitride-based semiconductor layer. A first undoped optical guide layer is formed on the active layer. A second conductivity type second nitride-based semiconductor layer having a single layer structure with a thickness of at least 0.1  $\mu\text{m}$  is formed on the first undoped optical guide layer. An undoped contact layer is formed directly on the second nitride-based semiconductor layer without another second conductivity type layer having a thickness of less than 0.1  $\mu\text{m}$  intervening therebetween. An electrode is formed directly on the undoped contact layer. The undoped contact layer has a thickness of at least about 1 nm and not more than about 10 nm, and the undoped contact layer does not include Al.

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<sup>1</sup> The Office Action rejected claims 1-4, 6, 9, 14-16, 23, and 26; and 27 and 28 in two separate rejections in view of Nakamura.



Another aspect of the invention, per claim 26 is a nitride-based semiconductor light-emitting device comprising a first conductivity type first nitride-based semiconductor layer formed on a substrate. An active layer is formed on the first nitride-based semiconductor layer. A second conductivity type second nitride-based semiconductor layer having a single layer structure with a thickness of at least  $0.1\ \mu\text{m}$  is formed on the active layer. An undoped contact layer is formed directly on the second nitride-based semiconductor layer without another second conductivity layer having a thickness less than  $0.1\ \mu\text{m}$  intervening therebetween. An electrode is formed directly on the undoped contact layer. The undoped contact layer has a thickness of at least about 1 nm and not more than about 10 nm.

Another aspect of the invention, per claim 27, is a nitride-based semiconductor light-emitting device comprising a first conductivity type first nitride-based semiconductor layer formed on a substrate. An active layer is formed on the first nitride-based semiconductor layer. A first undoped optical guide layer is formed on the active layer. A second conductivity type second nitride-based semiconductor layer, having a single layer structure with a thickness of at least  $0.1\ \mu\text{m}$ , is formed on the first undoped optical guide layer. An undoped contact layer is formed directly on the second nitride-based semiconductor layer without another second conductivity type layer having a thickness of less than  $0.1\ \mu\text{m}$  intervening therebetween. An electrode is formed directly on the undoped contact layer. The undoped contact layer has a single-layer structure and a thickness of at least about 1 nm and not more than about 10 nm.

The Examiner asserted that Nakamura substantially discloses the claimed nitride-based semiconductor light-emitting device in Fig. 2 except the undoped contact layer. The Examiner alleged that Nakamura teaches an undoped contact layer 8 in Fig. 1. The Examiner concluded that it would have been obvious to include an undoped contact layer in the embodiment of Fig. 1



of Nakamura to provide a semiconductor layer having less crystal defects and achieve a preferable ohmic contact with the p-electrode.

Nakamura, however, does not suggest the claimed nitride-based semiconductor light-emitting device. Contrary to the Examiner's allegations Nakamura does not disclose or suggest the undoped contact layer formed directly on a second nitride-based semiconductor layer, as required by claims 1, 26, and 27. Nakamura disclose a p-side contact layer 8 made of p-type GaN **doped with Mg** in Fig. 1 (see para. [0063]). One of ordinary skill in this art would immediately recognize that a **GaN layer doped with Mg**, as taught by Nakamura, is not an **undoped contact layer**. Nakamura, further do not suggest an undoped contact layer in view of Nakamura's express teaching that the p-side contact layer is doped with Mg.

Obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge readily available to one of ordinary skill in the art. *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). There is no suggestion in Nakamura to modify the device of Nakamura to include the undoped contact layer formed directly on a second nitride-based semiconductor layer, as required by claims 1, 26, or 27, nor does common sense dictate the Examiner-asserted modification. The Examiner has not established that there would be any obvious benefit in making the asserted modification of Nakamura. *See KSR Int'l Co. v. Teleflex, Inc.*, 500 U.S. \_\_\_\_ (No. 04-1350, April 30, 2007) at 20.

The mere fact that references can be modified does not render the resulting combination obvious unless the prior art also suggests the desirability of the modification. *In re Mills*, 916



F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Applicants submit that Nakamura does not suggest the claimed modifications to the device of Nakamura as alleged by the Examiner.

The only teaching of the claimed light emitting device is found in Applicants' disclosure. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must not be based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Claim 7 was rejected under 35 U.S.C. § 103 (a) as being unpatentable over Nakamura in view of Sugiura et al. (JP 10-215034). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

The combination of Sugiura et al. with Nakamura does not suggest the claimed nitride-based semiconductor light-emitting device because Sugiura et al. do not cure the deficiencies of Nakamura. Sugiura et al. do not suggest the claimed nitride-based semiconductor light-emitting device comprising an undoped contact layer formed directly on the second nitride-based semiconductor layer, as required by claim 1.

The dependent claims are allowable for at least the same reasons as respective independent claims from which they depend and further distinguish the claimed nitride-based semiconductor light-emitting device.

In view of the above remarks, Applicants submit that this application should be allowed and the case passed to issue. If there are any questions regarding this Response or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper,



**Application No.: 10/663,714**

including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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